MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2017/2018

PMT0104 – FUNDAMENTAL MATHEMATICS I

(All sections / Groups)

23 OCTOBER 2017
9.00 a.m. – 11.00 a.m.
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of **FOUR (4)** printed pages including the cover page with 4 questions only.
2. Answer all **FOUR (4)** questions
3. Write all your answers in the answer booklet provided.
4. Only NON-PROGRAMMABLE calculator is allowed.

Question 1 (25 Marks)

a) Simplify the expressions in a single fraction,

i. $\dfrac{2x-5}{x+4}-\dfrac{x-3}{x-2}$ **(6 marks)**

ii. $\dfrac{x+3}{x^2-9}\div\dfrac{x^2-4x+3}{x-1}$ **(6 marks)**

b) Express the following in standard form.

$$\frac{4-2i}{5}-\frac{3+3i}{1+6i}$$ **(7 marks)**

c) Simplify and express in terms of positive integer exponents.

$$\frac{(-2x)^4 y^{-9}}{(3x)^{-3} y^4}$$ **(6 marks)**

Question 2 (25 Marks)

a) Solve the equation $2x^2+3x+5=0$ by using quadratic formula. State the answer in standard form of complex number. **(6 marks)**

b) Solve the following equations

i. $\dfrac{2}{3}(2x-7)+5=\dfrac{1}{3}(x-6)$ **(3 marks)**

ii. $x+3-\sqrt{2x+6}=0$ **(5 marks)**

iii. $2-|x+5|=3x+4$ **(5 marks)**

c) Solve the inequalities:

i. $|2x-4|+3<6$ **(3 marks)**

ii. $3x-7\leq 4(2x+3)$ **(3 marks)**

Continued...

Question 3 (25 Marks)

a) Given $f(x) = \dfrac{3x+4}{3x-2}$,

i. Find the domain of $f(x)$. **(2 marks)**

ii. If $f(x) = -15$, find x. **(3 marks)**

iii. List all the intercepts, if any. **(3 marks)**

iv. Find $f^{-1}(x)$. **(5 marks)**

b) Given a function $f(x) = x^2 + 4x + 1$.

i. Form the function as $f(x) = (x + a)^2 + b$ by completing the square. **(3 marks)**

ii. Graph the function. Start with the graph of the basic function and show all the stages. **(5 marks)**

c) Use the Factor Theorem to determine whether the function

$$f(x) = 4x^3 - 2x^2 + 4x - 6$$

has the factor

i. $x - 1$ **(2 marks)**

ii. $x + 4$ **(2 marks)**

Question 4 (25 Marks)

a) Find the common difference of following the arithmetic sequence:

$$3, -2, -7, \ldots$$

Then, find the 21st term of the sequence and the sum of the first 21 terms. **(5 marks)**

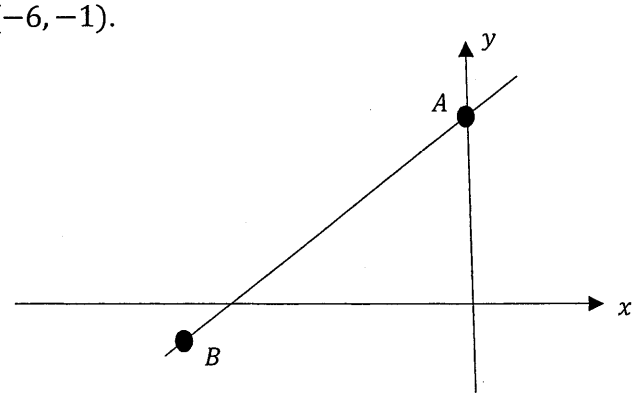
b) Find the 11th term of the following sequence:

$$-4, 8, -16, \ldots$$

Hence, find the sum of the first eleven terms. **(5 marks)**

Continued...

c) The graph below shows a straight line containing points $A(0,5)$ and $B(-6,-1)$.



Find

i. point C if B is the midpoint of straight line AC. **(4 marks)**

ii. the slope of AB. **(2 marks)**

iii. the equation of the straight line containing AB. **(3 marks)**

iv. the equation of a straight line that is perpendicular to line AB and passing through point $(-4,9)$. **(3 marks)**

v. the distance between A and B. **(3 marks)**

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